Bell Work
27-April-17

A- What is the difference in concentration of H/ H_3O+ between pH 2 and pH 5?

B- what is the $[H^+]$ concentration of a solution with a pH of 8.1?

$10^{-pH} = [H^+]$

Agenda

pH recap

pOH

pH → $[H^+]$ → $[OH^-]$ → pOH Flow Chart

Titrations

Objective: You will be able to intervonvert between pH → $[H^+]$ → $[OH^-]$ → pOH.

pH Cals. Solving for H+

A solution has a pH of 8.5. What is the Molarity of hydrogen ions in the solution?

$pH = - \log [H^+]$

$8.5 = - \log [H^+]$

$-8.5 = \log [H^+]$

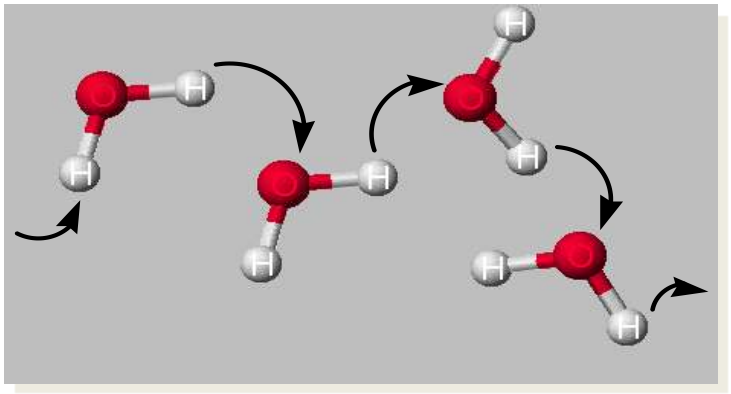
Antilog -8.5 = antilog ($\log [H^+]$)

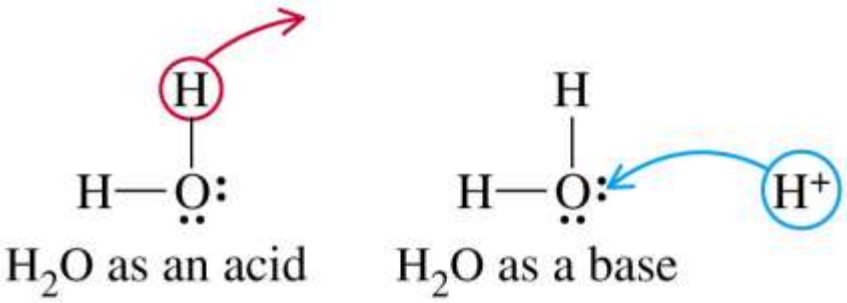
$10^{-8.5} = [H^+]$ → **3.16×10^{-9} M**

More about Water

H_2O can act as both an ACID & a BASE.

In pure water there can be AUTOIONIZATION





H_2O as an acid H_2O as a base

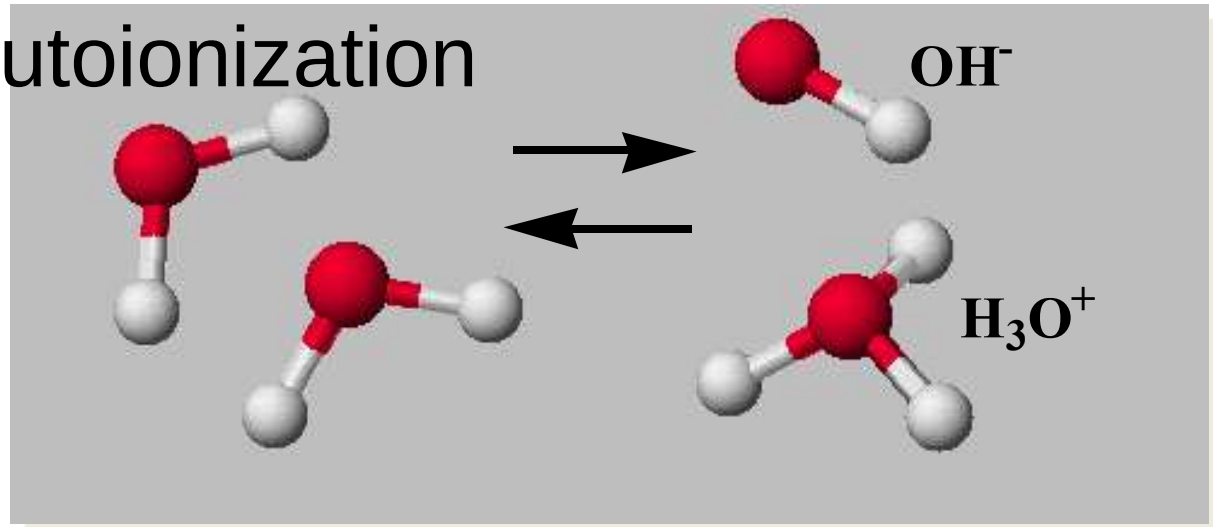
Equilibrium constant for water = K_w

$K_w = [H_3O^+]\,[OH^-] =$

$K_w = [H^+]\,[OH^-] =$

1.00×10^{-14} at 25 °C

More about Water



$K_w = [H_3O^+]\,[OH^-] = 1.00 \times 10^{-14}$ at 25 °C

In a neutral solution $[H_3O^+] = [OH^-]$

so $K_w = [H_3O^+]^2 = [OH^-]^2$

and so $[H_3O^+] = [OH^-] = 1.00 \times 10^{-7}$ M

pOH

Since acids & bases are opposites, pH and pOH are opposites!

pOH does not really exist, but it is useful for changing bases to pH.

$$\underline{pOH = - \log [OH^-]}$$

Since pH and pOH are on opposite ends of scale,

$$pH + pOH = 14$$

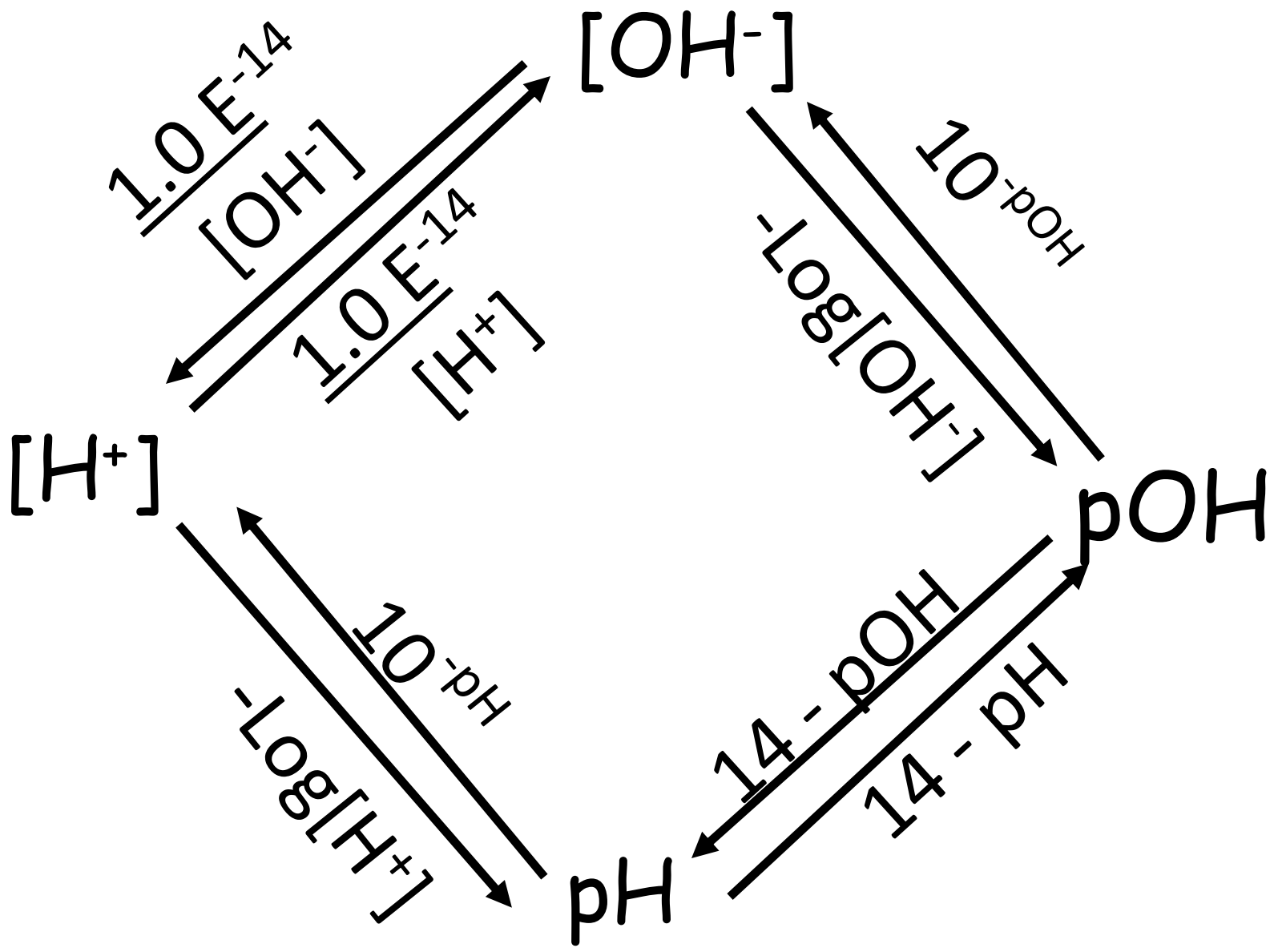
$\mathcal{K}_w$

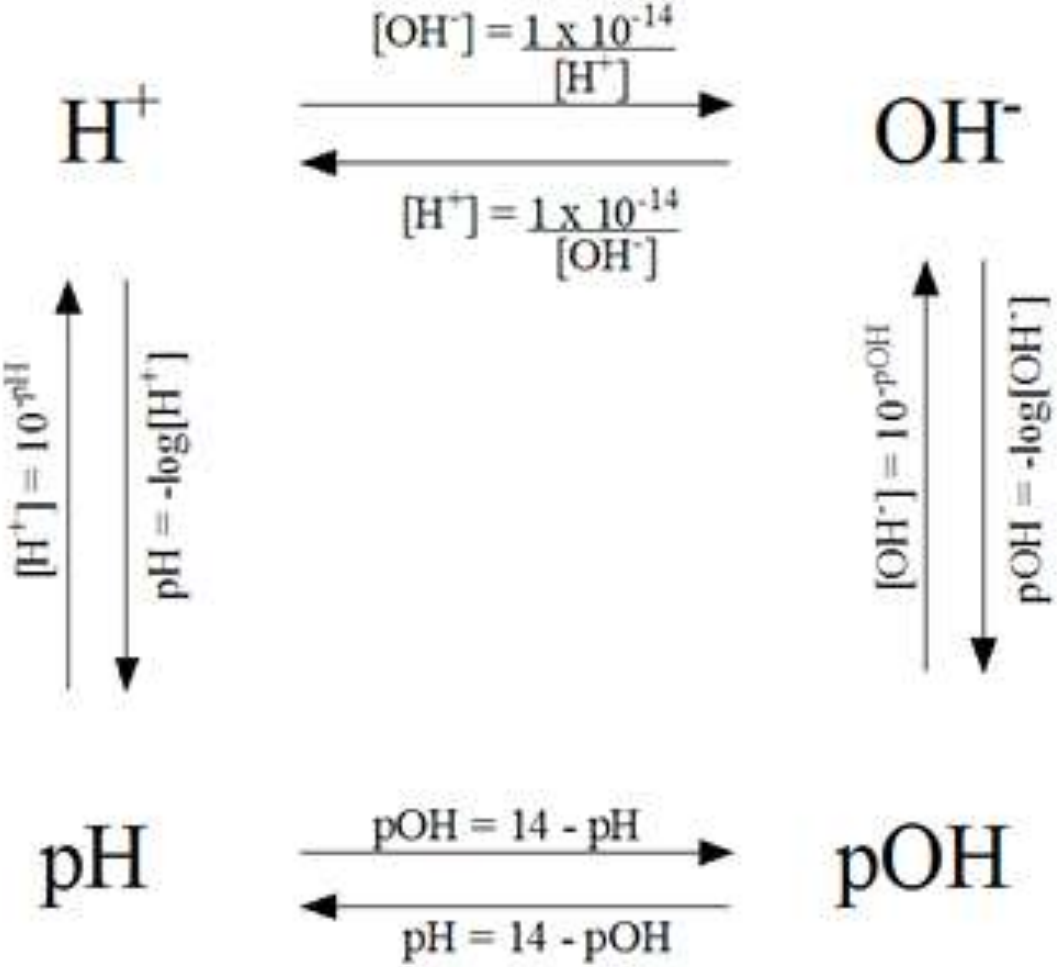
Water dissociation constant; K_w.

$K_w = 1.0 \times 10^{-14}$

$K_w = [H^+][OH^-]$

$1.0 \times 10^{-14} = [H^+][OH^-]$


[OH-]
pOH
pH
[H+]
1.0 E-14 / [OH-]
1.0 E-14 / [H+]
10-pOH
-Log[OH-]
10-pH
-Log[H+]
14 - pOH
14 - pH


$[OH^-] = \frac{1 \times 10^{-14}}{[H^+]}$
H^+
OH^-
$[H^+] = \frac{1 \times 10^{-14}}{[OH^-]}$
$[H^+] = 10^{-pH}$
$pH = -\log[H^+]$
$[OH^-] = 10^{-pOH}$
$pOH = -\log[OH^-]$
pH
pOH = 14 - pH
pOH
pH = 14 - pOH

Start:

Finish pH and pOH Calculations Practice #1,

Due 1May2017

Key will be posted on class web page